THURSDAY, SEPTEMBER 10, 1908.

NEW EDITION OF STRASBURGER'S BOTANY.

A Text-book of Botany. By Dr. E. Strasburger, Dr. Fritz Noll, Dr. H. Schenck, and Dr. G. Karsten. Third English edition, revised with eighth German edition by Dr. W. H. Lang. Pp. x+746. (London: Macmillan and Co., Ltd., 1908.) Price 18*s.* net.

THIS work is divided into two main divisions, "General Botany" and "Special Botany." The general botany commences with a section on morphology, external and internal. Some alterations from the second English edition have been made here, notably in the account and diagrams of mitosis. A paragraph on "reduction division," with illustrations, has been added. The description of the secondary tissues and their development is particularly good, but the new diagrams illustrating this subject do not add to the clearness.

Physiology is treated under the heads, stability of the plant body, nutrition, respiration, growth, movement, reproduction. There are numerous small changes and additions, chiefly due to research since the second English edition appeared. Several new illustrations, mostly taken from Schimper's "Plant Geography," have been introduced.

This is an excellent account of plant physiology for its size. A few criticisms, however, suggest themselves. Through an attempt to crowd too much into a small space, inadequacy, if not inaccuracy, has sometimes resulted. For example, in the discussion on the cause of the ascent of the transpiration current, the evidence for the theories based on "the cooperation of the living cells" and "the cohesive force of water" respectively is slurred over in a dozen lines, and twice as much space is devoted to dismissing "capillarity" and "atmospheric pressure," which, all admit, are quite insufficient as causes.

It seems a pity that the idea embodied in the term "circulation of nitrogen" has not been given prominence. Recent results tending to bridge over the gap between the taking in of CO_2 and the appearance of carbohydrates in assimilation are not mentioned.

The paragraph on hybridisation has been enriched by a short account of Mendelism. It has not been made sufficiently clear that the Mendelian proportions 2 : 1 : 1, &c., are only approximated to when large numbers are dealt with, and are dependent on the laws of chance. A slight inaccuracy in statement occurs in the last few lines of p. 314. It is not 50 per cent. *of the serrate leaved individuals,* but of the whole second generation, which are of hybrid nature. These 50 per cent. exhibit the dominant serrate character.

The greater part of the special botany has been re-written. The order of treatment is, as in the previous edition, from the lowest to the highest forms. Most of the sections on the Thallophytes have been enlarged and altered, and two extra classes have been added by the separation of the Heterocontæ from the green algæ and the division of the fungi into the classes Phycomycetes and Eumycetes. Numerous excellent new illustrations have been included which greatly add to the value of this part of the book. Particularly noticeable are several new figures of the behaviour of nuclei in the reproductive phenomena of the fungi. The Rhodophyceæ do not seem to have received enough attention compared with the other groups.

Amongst the Archegoniatæ the mosses are little altered. The classification of the ferns has been rearranged, and there are several new figures.

The remainder of the book, devoted to Phanerogams, has been completely re-written and re-illustrated. In the introduction to this part there is a very useful comparative table of the "Alternation of Generations." The treatment of the Gymnosperms, and especially of the Cycads, is distinctly good. In the Angiosperms, after a general description of each family, an account of some important genera of the family is given, the official plants of the British Pharmacopœia being noted in each case. This part of the book is very copiously and excellently illustrated, a large number of the figures being coloured. The colouring leaves something to be desired in several cases, but is much improved from the second English edition.

Throughout the work the arrangement and division into paragraphs is such as to secure the utmost degree of clearness. In each paragraph a leading idea is printed in larger type, so that it impresses itself on the memory, and serves as a centre round which the subsidiary ideas may be grouped. The usefulness of this is perhaps most noticeable in the part on physiology.

There are very few misprints. The only one worth noticing is on p. 280, line 41, where "heliotropism" should, of course, have been "geotropism."

The translator has been most successful in his work, the book reading as though originally written in English. In spite of the criticisms offered on a few points, this is one of the best, if not the best, text-book extant.

L. B. S.

FOREST ENTOMOLOGY.

Forest Entomology. By A. T. Gillanders. Pp. 422+xxii; 348 figures. (Edinburgh and London: Wm. Blackwood and Sons, 1908.) Price 15*s.* net.

MR. GILLANDERS, who is woods manager to His Grace the Duke of Northumberland, has produced a useful book for beginners in his "Forest Entomology." "The main feature which is attempted," we are told in the preface, "is recognition of the insect from the damage, together with systematic characters and life-history details." The first-named ideal has been well carried out, the figures given from photographs of the damage done being a great help to the practical forester and novice of forest entomology; we much regret, however, to see that the insects which cause the damage are frequently not shown at all.

The introduction, of eighteen pages, deals briefly with classification, metamorphosis, and structure.

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This part of the work we shall hope to see thoroughly revised in a future edition. The figure (10, p. 9) of typical mouth parts of insects is very poor, and the figure (2, p. 4) of the eggs of the lackey moth are certainly not typical of that insect, if they are the eggs of it at all. Several other figures in this section are also very unsatisfactory, such as Fig. 3, showing typical forms of larvæ; in this latter we see no caterpillar, no sawfly larva, and those that are shown are very unnatural. The first chapter deals with the Eriophyidæ or gall mites. The more common species that we find in woods and forests have their galls figured. In reference to the literature consulted and quoted, it is a pity the most important writings on the big-bud mite of Lewis and of Warburton are not mentioned.

There are two chapters on Coleoptera, the first dealing with chafers, long-horns, and weevils, including the troublesome pine weevils (*Hylobius abietis*) and the two Pissodes; we should like to have read a good deal more concerning these and the destructive beech Orchestes (*Orchestes fagi*).

The second chapter, of forty-five pages, deals entirely with bark beetles (Scolytidæ). The wood sculpturing of these destructive insects is shown by means of photographic reproductions. This part of the book is nearly complete, and alone makes it of value to the forester.

Pages 130 to 163 deal with oak galls formed by the Cynipidæ, and the chapter contains a useful synoptic table. Chapter v. deals with sawflies, including descriptions of the injurious pine sawflies (*Lophyrus pini* and *L. rufus*) and the large larch sawfly (*Nematus erichsoni*); the same chapter contains all that is essential for the forest student on the Siricidæ or wood wasps and the strange Megastigmi, parasitic on the seeds of the Douglas and silver firs.

Scale insects or Coccidæ form the subject of chapter vi.; the more important forest species are briefly described, including the ash scale (*Chionaspis salicis*) and the felted beech coccus (*Cryptococcus fagi*). Nothing is said about the great harm done by the former, or any suggestions as to how we may easily check its ravages. Regarding the felted beech coccus, the author writes:—

"A most interesting remedial measure has been brought under my notice at Blagdon, in Northumberland. With an inch auger bore three holes at about equal distances right into the centre of the trunk about three feet from the ground and sloping slightly towards the root of the tree. Into these holes [place] as much 'flowers of sulphur' as can be conveniently got in and then cork them firmly up with a plug of soft wood. This should be done in autumn and will be found successful."

We may point out that this has been tried frequently, and the coccus has not been affected in the least, except about four inches around the auger holes! A comparatively small number of Lepidoptera are described in chapter vii., but some of the more important ones are mentioned, such as the goat moth, vapourer, winter moth, oak tortrix, pine shoot tortrix, larch coleophora, and the new larch pest, *Argyresthia laevigatella*. The chapter on aphides, a family of insects at present little understood, contains an account of the pine chermes, six species being detailed and their general effects well illustrated. The recent valuable work of Börner[1] will, however, have to be included in a subsequent edition. Naturally, Diptera take up only a few pages, mostly on gall-flies or Cecidomyiidæ, which cause various deformities or galls on leaves, buds, wood, &c.

Several Psyllidæ are detailed in chapter x., including species on the ash, hawthorn, alder, and box.

There are also chapters on collecting and preparing insects, one on insecticides and general remedies, and also a list of trees with injurious insects.

The subject of beneficial insects is very cursorily dealt with, only four pages being devoted to this interesting part of economic entomology, but the author tells us that "the field of beneficial beetles in forest entomology is rather an unworked one," and probably the same may be said of the other groups, and hence, wisely, a few pages only are allotted to this subject, which is of more interest than any practical importance. There are two points we are very disappointed with in this work, and these are that the author, with all his wide, *practical* knowledge, has not told us, firstly, more of his own ideas, and, secondly, more of how we can prevent and destroy these interesting forest insects, which levy such a heavy toll amongst our forests, woods, and plantations.

Had this been done, the work, coming as it does from such an authority on forest insects and their ways, would have been of much greater value.

FRED. V. THEOBALD.

OUR BOOK SHELF.

An Introduction to the Theory of Groups of Finite Order. By H. Hilton. Pp. xii+236. (Oxford: Clarendon Press, 1908.) Price 14s. net.

IN many ways this book will prove a useful companion to treatises already available; especially, perhaps, on account of the large number of examples which it contains, and the hints for their solution. It may be confidently asserted that no example in group-theory is too elementary to be useful; the subject is on one side so very abstract, while on the other the individual properties of groups are numerous, and the protean disguises of the same group are amazingly varied.

The scope of Mr. Hilton's treatise may be indicated by stating that there is a chapter on Sylow's theorem, one on composition-series, and one on the characteristics of an Abelian group. All the main properties of Abelian groups appear to be mentioned; other groups that receive attention are those of the regular solids, and those known as Hamiltonian, linear homogeneous, and quaternion groups.

The chapter on characteristics is the last one, and does not profess to be more than a preliminary outline; it marks very well the limits of the author's plan, and will serve to induce the student to proceed to the very remarkable papers on this part of the subject by Frobenius, Burnside, and others. It is a pity that Mr. Hilton has not given a reference to these and some other of the most important memoirs; of course, no elaborate bibliography is expected in a work

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[1] "Eine monographische Studie über die Chermiden." By Dr. Carl Börner. (Berlin, 1908.)

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